



Location of the Vibrating Line with Respect to Fovea Palatini in Class I, Class II and Class III Soft Palate Types

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ABSTRACT:

OBJECTIVE: To determine the frequency of the location of vibrating line with respect to fovea palatini in different soft palate types among patients at Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences.

METHODOLOGY: A total of 197 subjects were included in the study and a clinical examination was carried out to examine the location of vibrating line whether it is anterior, posterior or at the fovea palatini in different soft palate types.

RESULTS: The vibrating line was located anteriorly to the palatine fovea in 68%, 70% and 50% of subjects with Class I, II and III soft palate types. The vibrating line coincided with the palatine fovea in 32%, 30% and 50% of the subjects with Class I, II and III soft palates. None of the subject in any soft palate type had the vibrating line present posteriorly to the palatine fovea.

CONCLUSIONS: The vibrating line was predominately found anterior to the palatine fovea in subjects with Class I and II soft palate palatini.

KEYWORDS: Fovea Palatini, Soft Palate, Vibrating line.

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INTRODUCTION

Although, a large number of people have started to retain their teeth in the old age but still a considerable proportion of patient's need complete dentures for their missing dentition^{1,2}. Treating edentulous patients is a demanding task. Complete denture prosthesis is mainly retained by the physical forces. The retention is primarily achieved by a valve-like seal between the border of denture

and the underlying mucosa which prevents trapping of air and liquids beneath the denture³. This kind of seal is difficult to achieve along the posterior border of maxillary denture prosthesis⁴.

In maxillary dentures, there is a need for extension of the posterior border so that adequate posterior palatal seal could be produced^{5,6}. The location of the posterior border of the maxillary denture plays a very important role in denture's retention, stability, support and patient's comfort⁷ and the determination of this area remains a critical step during the complete denture fabrication⁸.

Many studies have described the techniques of locating the posterior border of the maxillary complete denture and majority of the studies mention the displacement of soft tissues as the critical factor in the posterior palatal seal determination^{9,10}. Only a few have discussed the neurophysiologic and psychological considerations of extending the posterior border

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of maxillary denture^{9,10}. Some anatomical structures serve as reliable guidelines for the location of the posterior border of the maxillary denture. These guides are the fovea palatini which are clinically visible pits indentations close to the mid line of palate formed by coalescence of several mucous gland ducts and are usually located close to vibrating line within the soft tissues².

There is a general agreement that the posterior extent of the maxillary denture should extend at least to the vibrating line or the borders should terminate at the vibrating line¹⁰. The vibrating line is an imaginary line that is drawn across the palate and marks the beginning of the movement in the soft palate when the individual say "ah"². Extending from one hamular notch to the other, the line usually passes about 2 mm in front of the fovea palatini². It is physiologically present at the junction of the moveable and immovable portion of the soft palate¹⁰ and its location is largely dependent upon visual observation¹¹. The techniques for the determination of its location are based on the phonation of "ah" sound that causes the soft palate to lift^{2,11,12,13,14}, T burnisher palpatory method^{11,15}, swallowing method^{11,16,17} and nose-blowing or valsalva maneuver^{10,11,14,17,18}.

The location of vibrating line varies with the location of the contour of the soft palate¹⁹. The soft palate is the movable part of the palatal anatomy posterior to the hard palate²⁰ and its movement and degree of displace-ability varies in individuals⁶. Millsaps²¹ proposed three classes of palatal throat forms depending upon the angle formed between hard and soft palate. In class I, soft palate is horizontal or turns downward around 10 degree angle to the hard palate at mid palatal raphe, in class II, soft palate turns downward around 45 degree angle to the hard palate at midline, while in class III, soft palate turns downward around 70 degree angle to the hard palate respectively (Fig. 1).

The location of vibrating line relies on visual observation¹¹ and varies with the contours of the soft palate [19]. A flat palatal vault in class I soft palate is associated with a relatively straight vibrating line. A medium depth palatal vault of class II soft palate is associated with a slightly curved vibrating line towards the incisive papillae making a bow shape, while a high "V" shaped palatal vault in class III soft palate is associated with the vibrating line being acutely curved towards the incisive papillae making a broad "M"²².

Educational survey conducted by Rashedi and Petropoulos²³ suggested that a large percentage of teaching hospitals used the one vibrating line concept for establishing the posterior palatal seal. However; Silverman⁹ stated that the posterior palatal seal of maxillary denture could be extended to an average distance of about 8.2 mm dorsally to the vibrating line to aid retention and stability of the denture.

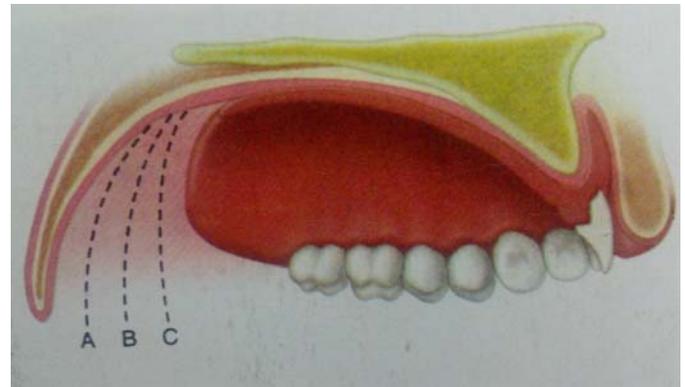


Fig. (1). Soft palate type (A) Class I, (B) class II, (C) Class III.

The rationale of this study is to determine the normal physiological location of vibrating line and fovea palatini in class I, class II and class III soft palate types. This study will contribute towards useful information that will be helpful for general dental practitioners and specialists in placing the posterior extent of the maxillary complete denture prosthesis.

METHODOLOGY

Sample size calculation for the cross-sectional study was performed using open epi website, using the data collected from a study conducted by Jongkittinarukorn²⁴. Consecutive sampling was done and the duration of study was six months. The patients meeting the inclusion criteria such as both gender (male and female), age range from 20 to 60 years, having normal pink color palatal mucosa with clinically visible fovea palatine in all soft palate types were selected and those patients with history of craniofacial trauma or surgery, congenital and acquired craniofacial anomalies, any inflammation or pathology of palatal mucosa and limited opening of mouth were excluded from the study.

The patients meeting the inclusion criteria were selected and the informed consent was taken verbally and written in Urdu and English language from each patient regarding their willingness and participation in the study and the selected patients were divided into four groups, after collection of data according to their age:

- Group A: 20 – 30 years
- Group B: 31 – 40 years
- Group C: 41 – 50 years
- Group D: 51 – 60 years

The selected patients were seated on dental unit in an upright position with head held erect and asked to open the

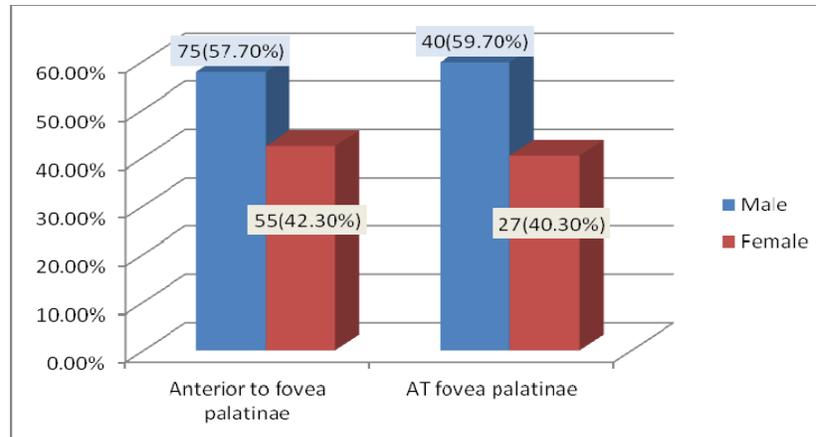


Fig. (2). (P- Value= 0.786).

Comparison of gender with respect to various location of vibrating line.

mouth wide, the palate of each patient was examined for the visibility of fovea palatini and soft palatal type (Class I, Class II and Class III) was observed by visual inspection and the findings were recorded in proforma.

After that the selected patients were instructed to pronounce “ah” sound in short bursts in a normal unexaggerated fashion repetitively to rehearse the “Ah” method until they became familiar with it. Mucosa of palate was dried using 2 X 2 cm gauze, as the soft palate moved up when the patients attempted to pronounce the “ah” sound, both the fovea palatini and the vibrating line were marked using an indelible pencil and the procedure was repeated twice to verify the accuracy of markings. The findings for the vibrating line were recorded in proforma as to whether it existed anteriorly, posteriorly or at the fovea palatine.

RESULTS

The results were analyzed using SPSS Version 16.0. The mean age of subjects were calculated. Frequency and percentage was calculated for genders and the various locations of vibrating line with respect to fovea palatini in class I, class II and class III soft palatal types. Stratification was done with regard to age and gender with respect to various locations of vibrating lines. The chi-square was done to observe the significant difference.

Out of the total number of 197 patients (n=197), 58.4% were males and 41.6% were females. The mean age of the patients was found to be 40.11 (± 12.039) years. Group A consisted of 25.9% (n=51) patients while group B had a total of 25.4% (n=50) patients. Group C had the highest number of patients n=52 (26.4%) and the lowest number was recorded in

group D, n=44 (22.3%). Out of this total number, 130 (66%) patients had vibrating line located anterior to fovea palatini while 67 patients (34%) had vibrating line located at the fovea palatini. None of patients had the vibrating line located posterior to the fovea palatini. Regarding the frequencies of palate types, soft palate class I type was 94 (47.7%), class II was 73 (37.1%), and class III was found to be 30 (15.2%). The vibrating line was found to be anteriorly present in 64 patients (68.1%) of soft palate class I type while in soft palate class II type, the number was 51(69.9%). None of soft palate classification showed location of vibrating line posterior to fovea palatini (Table 1). Chi-Square test was used to analyze the relation between gender and age groups with respect to various locations of vibrating line for stratification. There was no statistically significant difference seen (Table 2 and 3).

DISCUSSION

Despite the advances in implant dentistry, the fabrication of complete denture still remains the common prescription. Therefore, meticulous procedures have to be followed to ensure the success of complete denture²⁵⁻²⁷. A successful complete denture treatment should meet patient’s functional needs and gain their acceptance and well retained prosthesis must be provided²⁸⁻³⁰.

The currently used multiple techniques for location of the vibrating line. These include phonation of the “ah” sound, palpatory method, swallowing method and the nose-blowing or valsalva maneuver^{2,11,14,15,17,18}. The “ah” method for location of vibrating line is used in the present study is a convenient method and mostly taught in US and Canadian dental schools and also in dental institutions of Pakistan^{23,31,33}.

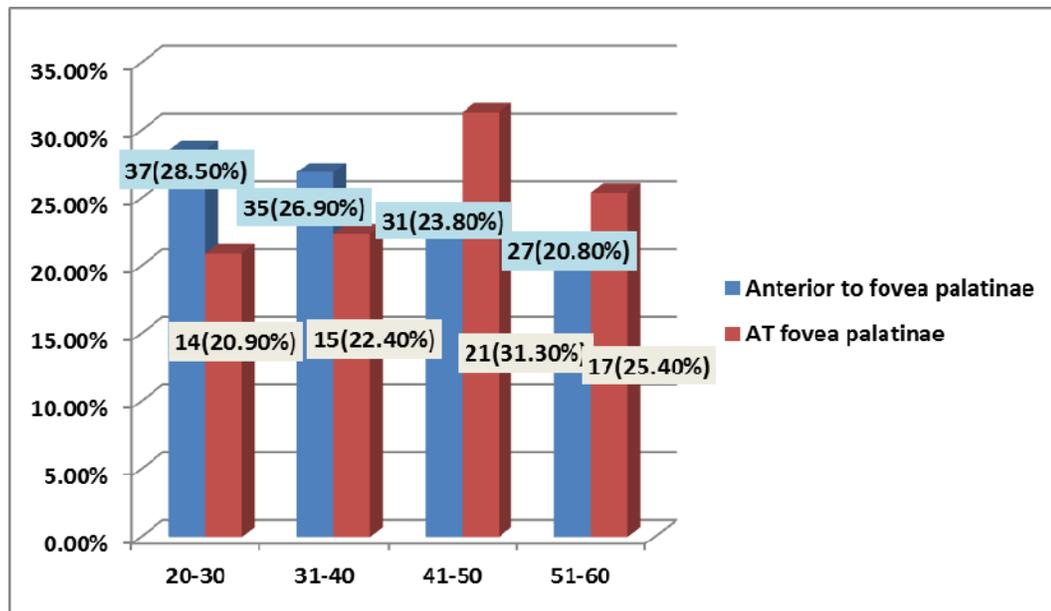


Fig. (3). (P- Value = 0.441).

Comparison of age groups with respect to various location of vibrating line.

Table 1. Frequency and percentage of various location of vibrating line with respect to fovea palatinae in Class I, II and III soft palate types.

Soft palate types	Location of Vibrating line with respect to Fovea Palatini			Total
	Anterior to fovea palatini	AT fovea palatini	Posterior to fovea palatini	
Class I	64 (68.1%)	30 (31.9%)	0 (0%)	94 (47.7%)
Class II	51 (69.9%)	22 (30.1%)	0 (0%)	73(37.05%)
Class III	15 (50%)	15 (50%)	0 (0%)	30 (15.22%)
Total	130 (66%)	67 (34%)	0	197

Table 2. Location of vibrating line with respect to fovea palatine in gender. P value (0.786).

Gender	Location of Vibrating line with respect to Fovea Palatini			Total
	Anterior to fovea palatini	AT fovea palatini	Posterior to fovea palatini	
Male	75	40	0 (0%)	115
Female	55	27	0 (0%)	82
Total	130	67	0	197

Table 3. Location of vibrating line with respect to fovea palatine in age groups P value (0.441).

Chi-Square Tests ^d						
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	.073 ^a	1	.786	.879	.454	
Continuity Correction ^b	.014	1	.906			
Likelihood Ratio	.074	1	.786	.879	.454	
Fisher's Exact Test				.879	.454	
Linear-by-Linear Association	.073 ^c	1	.787	.879	.454	.117
N of Valid Cases	197					

Age groups	Location of Vibrating line with respect to Fovea Palatini			Total
	Anterior to fovea palatini	AT fovea palatini	Posterior to fovea palatini	
20-30 Years	37	14	0 (0%)	51
31-40 Years	35	15	0 (0%)	50
41-50 Years	31	21	0 (0%)	52
51-60 years	27	17	0 (0%)	44
Total	130 (66%)	67 (34%)	0	197

Age group* Location of VI with respect to FP.

Lye³² carried out a study on 100 subjects and concluded that 92 of patients showed the presence of fovea palatini. The result of his study showed the vibrating line was anterior to the foveae palatini in 12 subjects (13.04 %). The foveae palatini and vibrating line coincided in 16 patients (17.39 %). The vibrating line was posterior to the foveae palatini in 64 subjects. Chen¹⁰ in Ohio checked the reliability of the fovea palatini in determining the posterior border of the maxillary denture. Out of a total number of 104 subjects in his study, 72 had fovea palatini visible clinically. He also stated that the nose-blowing method appears to be an accurate method for locating the fovea palatini and the vibrating line. Among 72 of his selected subjects, 25% had their vibrating line present on the fovea palatine and 75% had their vibrating line located anterior to the fovea palatini and none of the subjects had the vibrating line present posterior to the fovea palatini. These findings are similar to the results of the current study.

A study was conducted by Alousi⁷ which included 200 patients selected randomly without inclusion of soft palate types. The result of his study showed that 50.9% of patients had their vibrating line located at fovea palatini, 44.5% had it in front and 6.4% posterior to the fovea palatini. He concluded that fovea palatini is a reliable anatomical landmark that helps in determining post dam area of denture because and that there was no significant difference between gender and location of

vibrating line in relation to fovea palatini. This finding of his study is similar to the finding of our study.

CONCLUSIONS

The vibrating line was predominately found anterior to the fovea palatine in subjects with Class I and II soft palate. Almost half of the subjects with deep soft palate (Class III type palate) had their vibrating line present on the fovea palatini. However, none of patients had their vibrating line location posterior to the fovea palatine in class I, II and III soft palate.

DISCLOSURE

NONE declared.

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